

Women production of spirulina in the Lake Chad region

Sentinel-2 MSI acquired on 07 June 2021 at 09:20:31 UTC

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Sentinel-2 MSI acquired on 25 September 2021 at 09:20:31 UTC

Sentinel-2 MSI acquired on 19 November 2021 at 09:21:59 UTC

Sentinel-2 MSI acquired on 27 February 2022 at 09:20:29 UTC

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[2D Layerstack](#)

Fig. 1 - S2 (27.02.2022) - Sentinel-2 composite highlighting the cyan colour of Lake Chad and its importance for the vegetation of the region. [2D view](#)

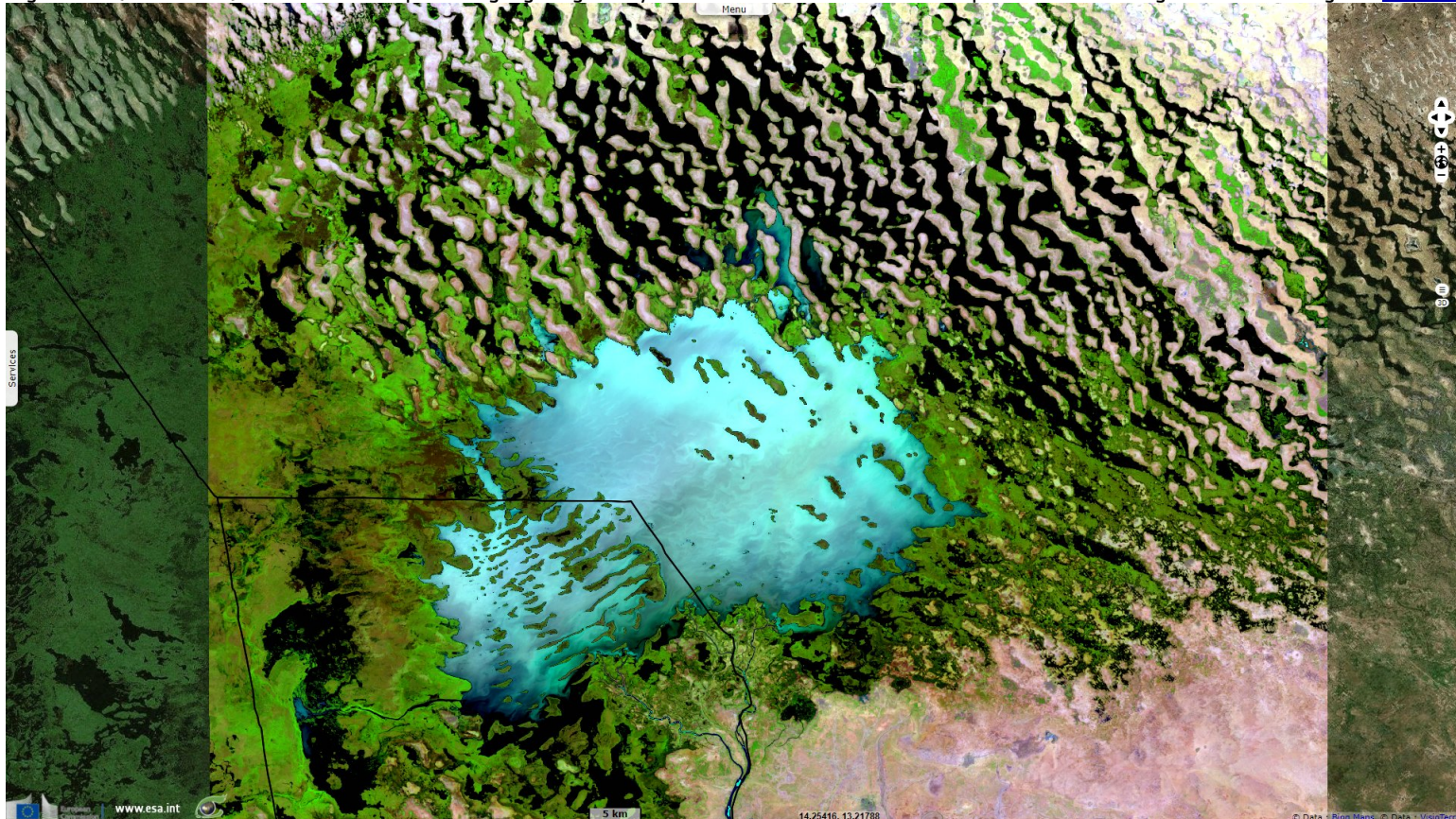
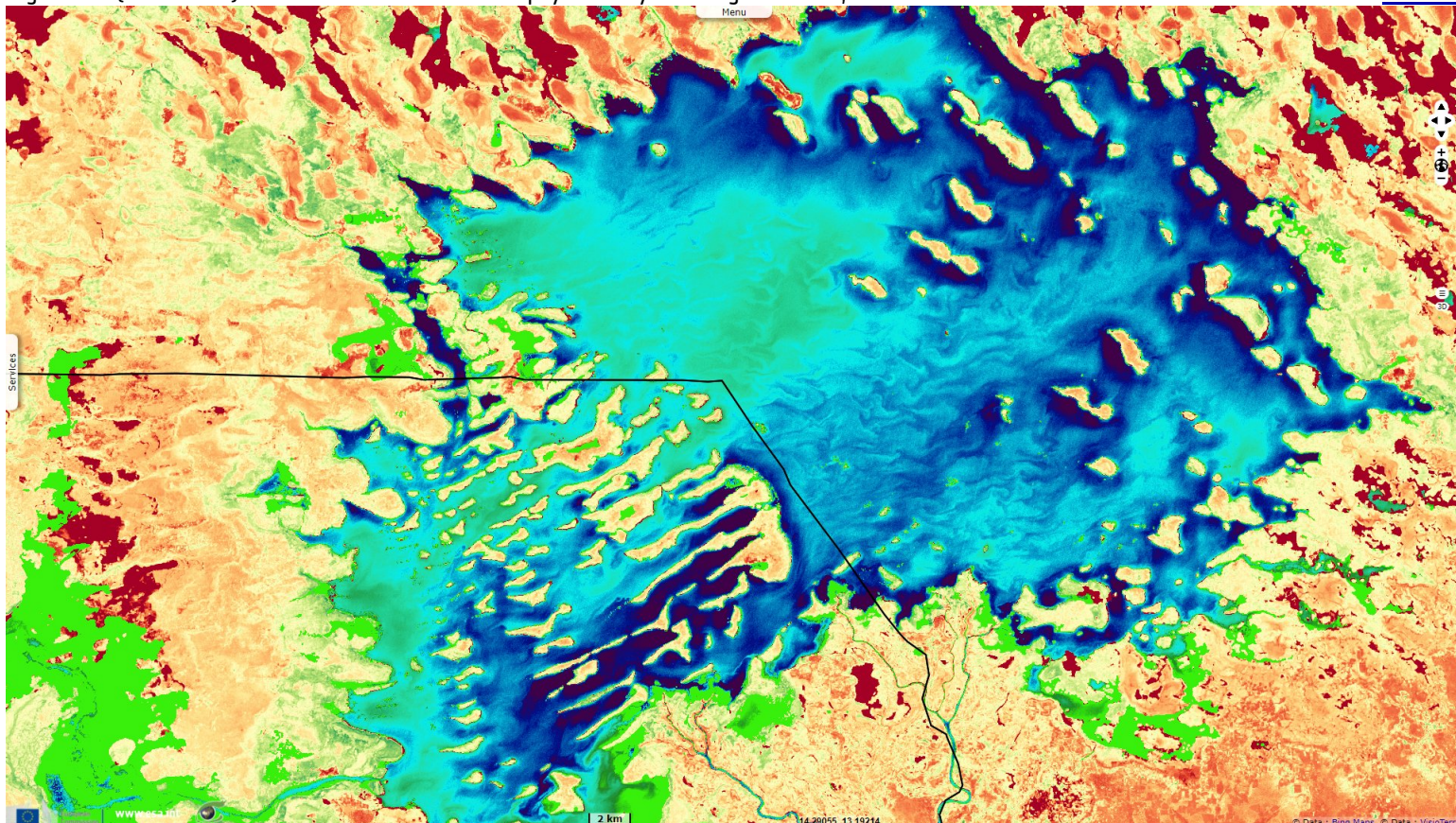
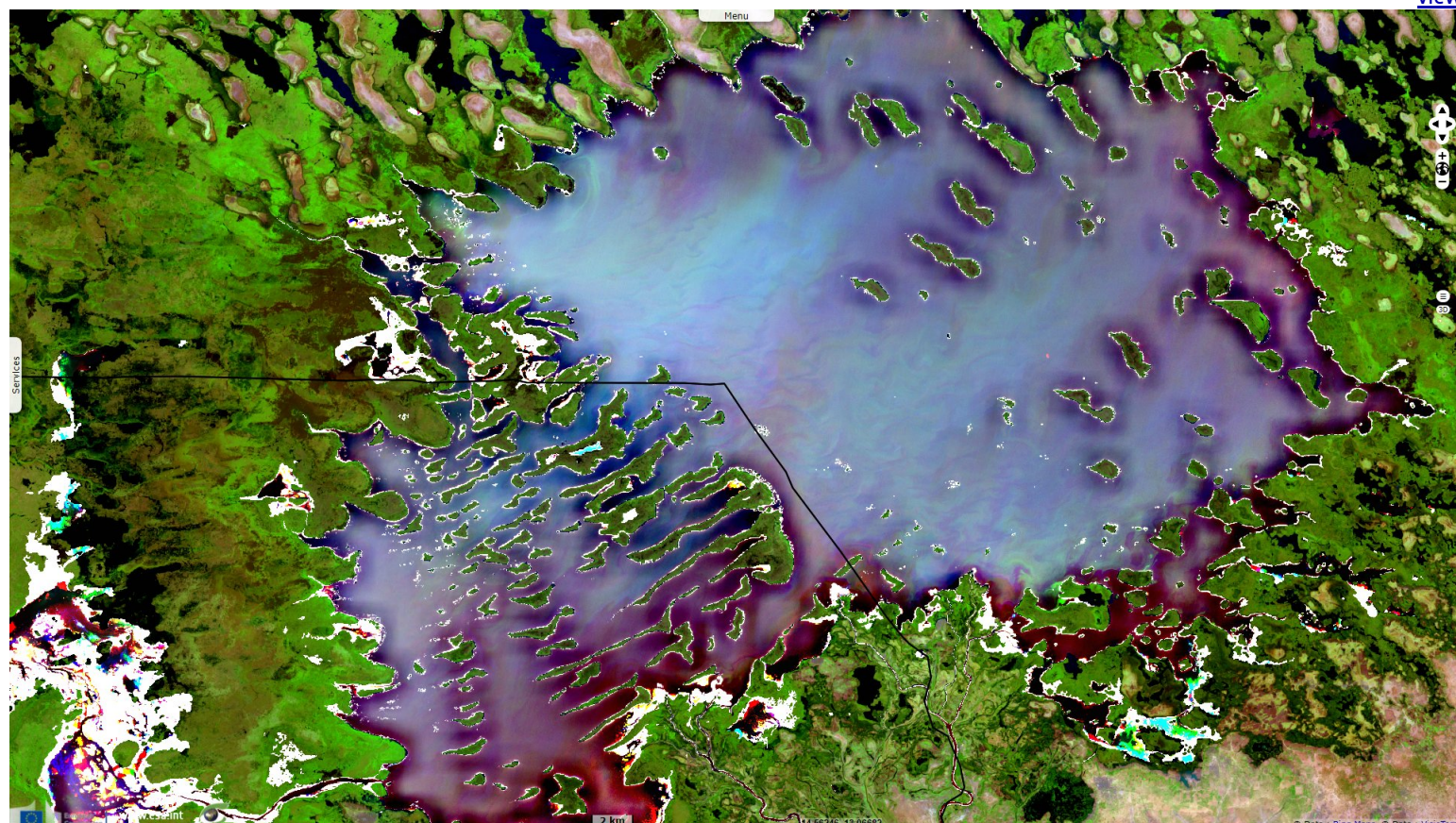


Fig. 2 - S2 (27.02.2022) - The NDVI shows the chlorophyll activity is stronger at west, where the water is more blueish on the above view. [2D view](#)



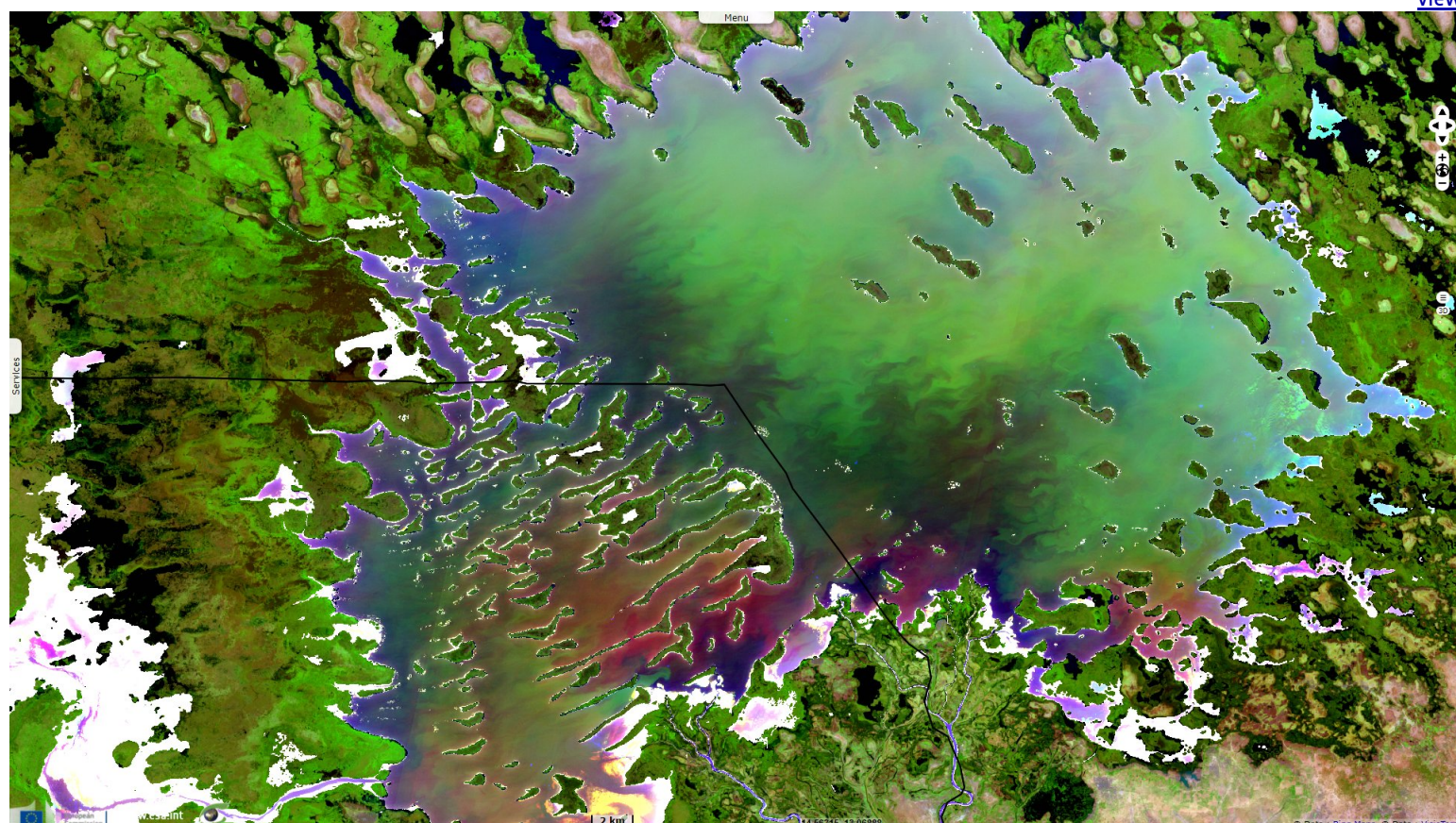
Spirulina is a plant that is extremely rich in protein, iron, betacarotene and vitamin B.12. The particularity of spirulina is that it is the richest vegetable in protein, between 60 and 70% of the dry matter. By way of comparison, 15g of this blue algae is equivalent to 100g of beef. It represents a very important source of income, but is exploited in an artisanal manner by a small segment of Chadian society.

Fig. 3 - S2 (19.11.2021, 29.12.2021, 23.01.2022) - Multidate composite showing the variations of chlorophyll activity during the winter months. [2D view](#)



3000 young women are transforming a traditional practice into a much-needed source of jobs and income. Climate change and a rapidly expanding population has caused Lake Chad to shrink by 90% since the 1960s from 25000 km² to 2500 km², and creating more jobs is crucial to both protecting the shrinking lake and addressing the wider humanitarian crisis in the Sahel.

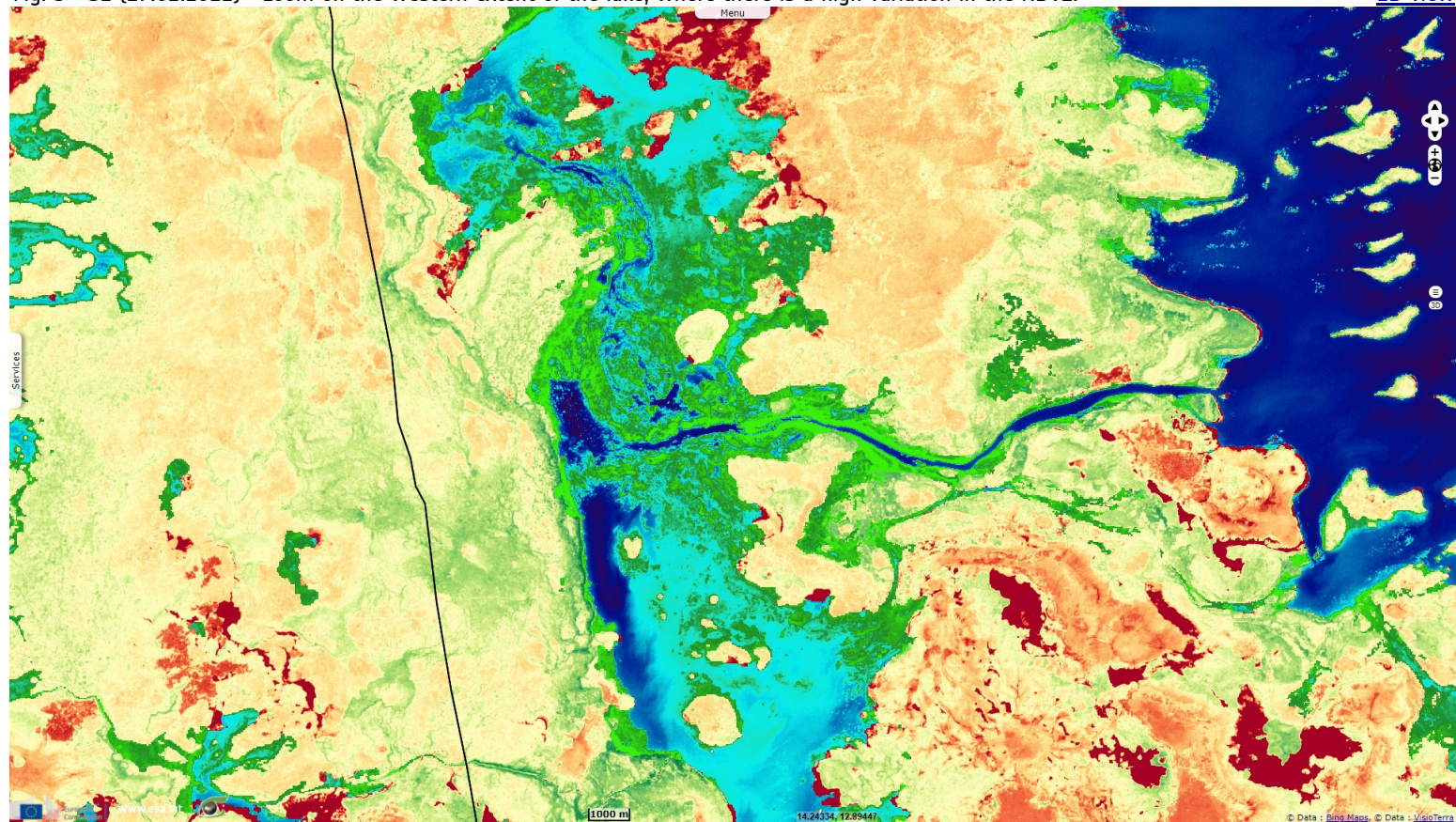
Fig. 4 - S2 (07.06.2021, 02.07.2021, 10.09.2021) - Multidate composite showing the variations of chlorophyll activity during the summer months. [2D view](#)



The spirulina processing is part of an €8 million project by the EU's flagship climate change programme GCCA+ to help communities in Chad adapt to the impacts of climate change and develop renewable energies. As a useful alternative for meat it is also helpful to curb climate change on the consumer side.

Fig. 5 - S2 (27.02.2022) - Zoom on the western extent of the lake, where there is a high variation in the NDVI.

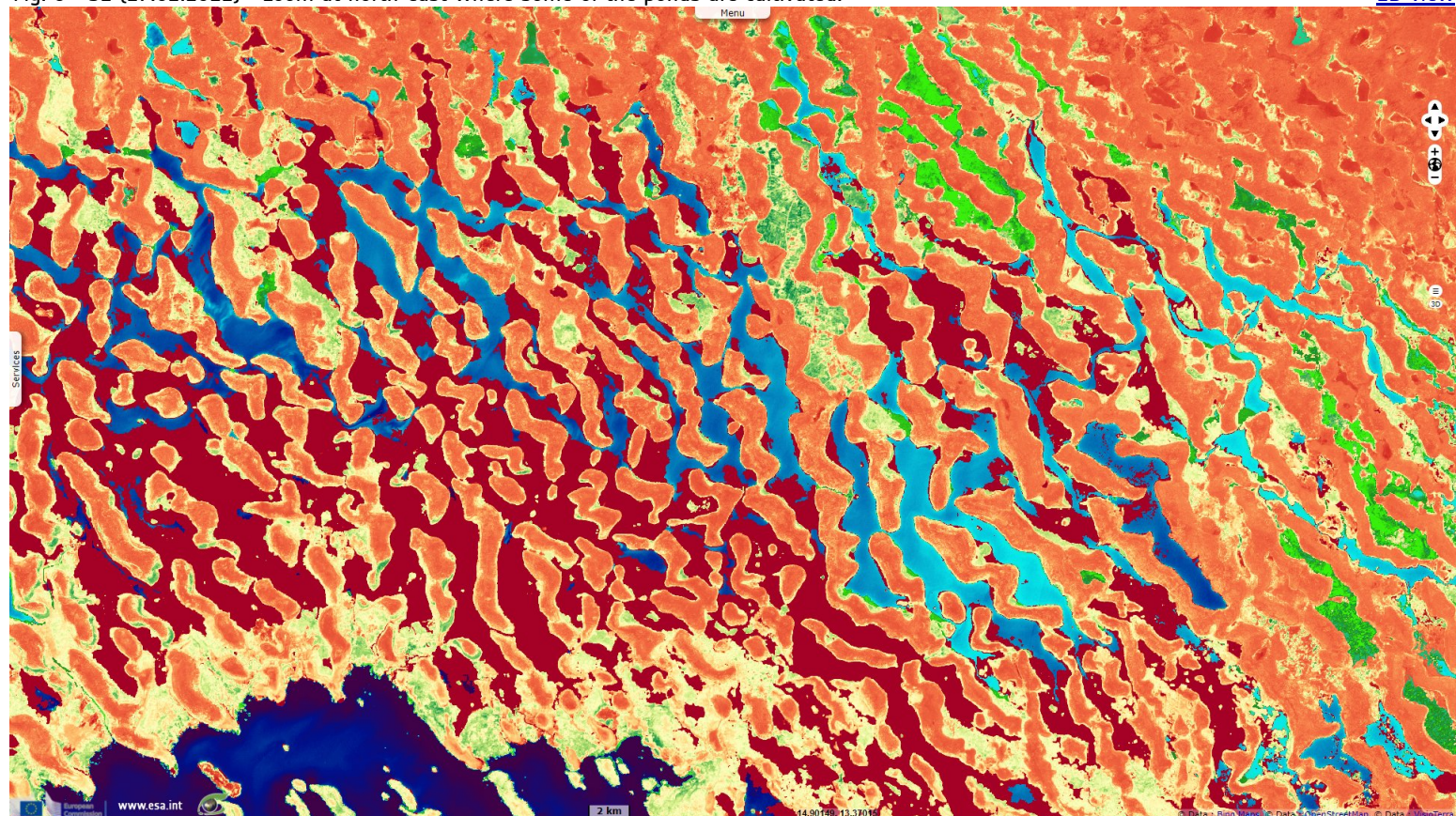
[2D view](#)



The process generally used by women to collect spirulina consists of taking water from the pond in iron containers and pouring it into a spherical tank made in the dunes. This filters the water and leaves deposits of algae which then form a kind of cake. Where it is cultivated, spirulina harvesting is the main activity of the women, as their working time devoted to this activity is about 300 days per woman per year.

Fig. 6 - S2 (27.02.2022) - Zoom at north-east where some of the ponds are cultivated.

[2D view](#)



Spirulina is a freshwater micro-alga belonging to the family of cyanobacteria or "blue-green" algae, of very ancient origin (2 to 3 billion years), one of the very first micro-organisms on earth. This algae develops and proliferates rapidly in brackish, salty water rich in sodium carbonate. A temperature of between 28°C and 32°C and an environment with a PH of 11 is very favourable.

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